

Listing of Claims

1. (Currently amended) An electronic control unit for automobiles comprising;

a microcomputer for operating a control signal for controlling a state of an automobile on the basis of an input signal from a sensor; and

an output driver circuit for driving an actuator by said control signal obtained by said microcomputer, ~~wherein;~~

wherein said output driver circuit is composed of a driver IC into which power transistors in correspondence to a plurality of channels, a serial communication interface for executing serial communication with said microcomputer, and a ~~driver IC which is a semiconductor circuit having integrated timer circuits~~ timer circuit for generating at least one of a pulse width modulation signal and a pulse signal for said power transistors are integrated; and

wherein said timer circuit, on the basis of said control data signal received from said microcomputer by said serial communication interface, generates at least one of said pulse width modulation signal and said pulse signal.

2. (Original) An electronic control unit for automobiles according to Claim 1, wherein;

said microcomputer supplies a clock signal for timer count to said timer circuit built in said driver IC; and

said timer circuit, on the basis of a control data signal for setting the frequency and duty of said pulse width modulation signal transmitted from said microcomputer, generates a pulse width modulation signal.

3. (Currently amended) An electronic control unit for automobiles ~~according to Claim 1;~~ comprising:

a microcomputer for operating a control signal for controlling a state of an automobile on the basis of an input signal from a sensor; and

an output driver circuit for driving an actuator by said control signal obtained by said microcomputer; wherein

said output driver circuit is composed of power transistors in correspondence to a plurality of channels, a serial communication interface for executing serial communication with said microcomputer, and a driver IC which is a semiconductor circuit having integrated timer circuits for generating a pulse width modulation signal and a pulse signal; and

said timer circuit, on the basis of said control data signal received from said microcomputer by said serial communication interface, generates said pulse width modulation signal and said pulse signal; and

wherein said microcomputer supplies an engine rotation synchronized signal generated on the basis of a clock signal for timer count and signals of a crank angle sensor and a cam angle sensor to said timer circuit built in said driver IC; and

said timer circuit generates, on the basis of a control data signal received from said microcomputer by said serial communication interface, generates said pulse width modulation signal and said pulse signal.

4. (Original) An electronic control unit for automobiles according to Claim 3, wherein said engine rotation synchronized signal is a pulse signal indicating that the piston of each cylinder of said engine is positioned at a specific reference point and the pulse width of said signal depends on the cylinder number.

5. (Currently amended) An electronic control unit for automobiles ~~according to Claim 1; comprising:~~

a microcomputer for operating a control signal for controlling a state of an automobile on the basis of an input signal from a sensor; and

an output driver circuit for driving an actuator by said control signal obtained by said microcomputer; wherein

said output driver circuit is composed of power transistors in correspondence to a plurality of channels, a serial communication interface for executing serial communication with said microcomputer, and a driver IC which is a semiconductor circuit having integrated timer circuits for generating a pulse width modulation signal and a pulse signal; and

said timer circuit, on the basis of said control data signal received from said microcomputer by said serial communication interface, generates said pulse

width modulation signal and said pulse signal; and

wherein[[;]] said microcomputer supplies a clock signal for timer count to said timer circuit built in said driver IC; and

said timer circuit, on the basis of a crank angle sensor signal and a cam angle sensor signal which are input to said timer circuit, discriminates the position of each cylinder of said engine and on the basis of a control data signal for setting the frequency and duty of said pulse width modulation signal transmitted from said microcomputer, generates a pulse width modulation signal.

6. (Original) An electronic control unit for automobiles according to Claim 5, wherein said timer circuit built in said driver IC has a register for storing a specification for pulse patterns of said crank angle sensor signal and said cam angle sensor signal.

7. (Original) An electronic control unit for automobiles according to Claim 1, wherein said driver IC additionally has an integrated A-D converter, converts a sensor signal to a digital signal by said A-D converter, and transmits a conversion result to said microcomputer via said serial communication.

8. (Original) An electronic control unit for automobiles according to Claim 1, further comprising, in addition to said driver IC, an A-D conversion IC

composed of an A-D converter and a serial communication interface, wherein an A-D conversion result by said A-D converter is transmitted to said microcomputer via said serial communication.

9. (Currently amended) ~~An electronic control unit for automobiles comprising an~~ An output driver circuit for driving an actuator by a control signal obtained by a microcomputer for operating said control signal for controlling the state of an automobile on the basis of an input signal from a sensor,

wherein said output driver circuit ~~including~~ is composed of a drive IC into which power transistors in correspondence to a plurality of channels, a serial communication interface for executing serial communication with said microcomputer, and a ~~driver IC which is a semiconductor circuit having integrated timer circuits~~ timer circuit for generating at least one of a pulse width modulation signal and a pulse signal for said power transistors are integrated, and

wherein said timer circuit, on the basis of a control data signal for setting output start timing and output end timing or output start timing and pulse width of said pulse signal transmitted from said microcomputer, generates a pulse signal.